Waves

8-6 The student will demonstrate an understanding of the properties and behaviors of waves. (Physical Science)

8-6.3. Summarize factors that influence the basic properties of waves (including frequency, amplitude, wavelength, and speed).
Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/Future knowledge: Students have not been introduced to the concept of waves in previous grade levels. Students will further develop the concept of waves quantitatively in high school Physical Science (PS-7.4)

It is essential for students to know that the basic properties of waves are influenced by several factors.

Frequency
- *Frequency* is a measure of how many waves pass a point in a certain amount of time.
- The higher the frequency, the closer the waves are together and the greater the energy carried by the waves will be.

Amplitude
- *Amplitude* is a measure of the distance between a line through the middle of a wave and a crest or trough.
- The greater the force that produces a wave, the greater the amplitude of the wave and the greater the energy carried by the wave.
- In a transverse wave the higher the wave, the higher the amplitude.
- Sounds with greater amplitude will be louder; light with greater amplitude will be brighter.

Wavelength
- *Wavelength* is a measure of the distance from the crest on one wave to the crest on the very next wave.
- Shorter wavelengths are influenced by the frequency.
- A higher frequency causes a shorter wavelength and greater energy.

Speed
- *Speed* is a measure of the distance a wave travels in an amount of time.
- The speed of a wave is determined by the type of wave and the nature of the medium.
- As a wave enters a different medium, the wave's speed changes. Waves travel at different speeds in different media.
- All frequencies of electromagnetic waves travel at the same speed in empty space.

NOTE TO TEACHER: Properties of waves will be diagrammed using transverse waves only.

It is not essential for students to know how to calculate the speed of a wave or how to diagram these properties on a longitudinal wave.–

Waves

8-6 The student will demonstrate an understanding of the properties and behaviors of waves. (Physical Science)

Assessment Guidelines:

The objective of this indicator is to *summarize* factors that influence the basic properties of waves; therefore, the primary focus of assessment should be to generalize major points about how properties of waves (including frequency, amplitude, wavelength, and speed). However, appropriate assessments should also require students to *recognize* the basic properties of waves; *recall* the factors that influence the basic properties of waves; or *interpret* or *illustrate* diagrams of transverse waves by identifying specific characteristics stated previously.